



Outlet Survey Report (Baseline)

Republic of Benin

10/08



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Definitions

Antimalarial combination therapy – The simultaneous use of two or more drugs with different modes of action to treat malaria.

Artemisinin and its derivatives – Artemisinin is a plant extract used in the treatment of malaria. The most common derivatives of artemisinin used to treat malaria are artemether, artesunate, and dihydroartemisinin.

Artemisinin-based Combination Therapy (ACT) – A combination of artemisinin or one of its derivatives with a partner drug. The partner drug is an antimalarial(s) of a different class.

First-line treatment – The government recommended treatment for uncomplicated malaria. Benin’s first-line treatment for malaria is artemether-lumefantrine, 20mg/120mg. (See Appendix B for adult and child dosing regimens.)

Monotherapy – Antimalarial treatment with a single medicine: either a single active compound or a synergistic combination of two compounds with related mechanisms of action, such as sulfadoxine-pyrimethamine.

Nationally registered ACTs – ACTs registered with a country’s national drug regulatory authority and permitted for sale or distribution in-country. Each country determines its own criteria for placing a drug on its nationally registered listing. (See Appendix B for a complete list of Benin’s nationally registered ACTs.)

Non-artemisinin therapy – An antimalarial treatment that does not contain artemisinin or any of its derivatives.

Non-WHO/Nationally registered ACTs – ACTs that neither appear on the WHO list of ACTs approved for procurement nor are registered with a given country’s national drug regulatory authority.

Oral artemisinin monotherapy – Artemisinin or one of its derivatives in a dosage form with an oral route of administration. These include tablets, suspensions, and syrups and exclude suppositories and injections.

Second-line treatment – The government recommended second-line treatment for uncomplicated malaria. Benin’s second-line treatment for malaria is quinine. Second-line treatment indicators include all dosage forms.

WHO approved ACTs – ACTs that appear on the WHO list of antimalarials approved for procurement.

Legend for tables –

Symbol	
--	No data was available
n/a	Not applicable: Indicates ratios cannot be calculated as the numerator is zero
***	Undefined ratio as a non-zero value is being divided by a value of zero
AM	Antimalarial
AL	Artemether-Lumefantrine
ACT	Artemisinin-based Combination Therapy
CQ	Chloroquine
SP	Sulfadoxine-Pyrimethamine

Key Indicator Descriptions

Acceptable storage conditions for medicines – An outlet is considered to have acceptable storage conditions for medicines if it is in compliance with all the following three standards: (1) medicines are stored in a dry area; (2) medicines are protected from direct sunlight; and (3) medicines are not kept on the floor.

Availability of antimalarials – The proportion of outlets in which an antimalarial medicine was found on the day of the survey, based on an audit conducted by the interviewer. For indicators of availability, all outlets surveyed are included in the denominator.

Credit to consumers – An outlet is considered to provide credit to consumers based on response of the provider. Providers in public health facilities were not asked this question.

Disruption in stock – An outlet is considered to have a disruption in stock where any drug is reported to have been out of stock in the three months prior to interview, or where a drug is not in stock at the time of the visit but was stocked at some point in the previous three months.

Expired stock – Indicators of expired stock are based upon the expiry information from one sample of each drug audited in an outlet; a full examination of all packages in stock was not conducted.

Health danger signs – Indications considered health danger signs are taken from the World Health Organization, (2005). Handbook: IMCI integrated management of childhood illness. Available at <http://whqlibdoc.who.int/publications/2005/9241546441.pdf>. Questions assessing knowledge of health danger signs were not asked of providers at public health facilities.

International reference price – International reference price information taken from: Management Sciences for Health, (2007). International Drug Price Indicator Guide. Available at <http://erc.msh.org/mainpage.cfm?file=1.0.htm&module=DMP&language=English>. The international reference price for AL 20mg/120mg is US\$2.12 for a full adult treatment.

Minimum legal daily wage – Minimum daily wage information taken from: United States Department of State, (2007). Country Reports on Human Rights Practices. Available at <http://www.state.gov/g/drl/rls/hrrpt/2007/index.htm>. In Benin, the minimum legal daily wage is US\$1.94.

Microscopic blood or rapid diagnostic testing – An outlet is considered to have microscopic or rapid diagnostic blood testing based on provider response. Functionality of the diagnostic test was not observed by the interviewer.

Most popular antimalarial – The antimalarial with the largest volume of full adult courses sold or distributed in the past week.

Price – Prices are calculated in terms of purchases required for a full-course treatment. Only adult tablet formulations are included these calculations. Prices are shown in US dollars. The average exchange rate during the data collection period (17th to 31st October 2008) was 515 Benin Communate Financiere Africaine Franc (XOF) to US\$1 (www.oanda.com).

Statistical significance – Mood's median test is used to compare medians and chi-square tests are used to compare proportions between categories. P values are based on the standard type 1 error rate of 0.05, divided by the number of comparisons, to determine a type 1 error rate that is no more likely to produce a false positive across multiple tests than a single test with a $p < 0.05$.

Volumes – Volumes are calculated in terms of purchases required for a full-course treatment. Only adult tablet formulations are included.

Executive Summary

Background:

The outlet survey is one of the *ACTwatch* research components. The objective is to monitor levels and trends in the availability, price and volumes of antimalarials, and providers' perceptions and knowledge of antimalarial medicines at different outlets.

This report presents indicators on availability, price, volumes, affordability in outlets and provider knowledge of antimalarials. National trends are presented first, followed by indicators presented across outlet categories and urbanisation.

Methods:

A nationally representative sample of all outlets that could sell or provide antimalarials to a consumer was taken through a census approach in 19 sub-districts in Benin. Sampling was conducted using a one-stage probability proportional to size (PPS) cluster design, with the measure of size being the relative sub-district population.

Outlet inclusion criteria for this study included outlets which stocked an antimalarial at the time of survey or in the previous three months. An outlet is defined as any point of sale or provision of commodities for individuals. Outlets included in the survey are as follows: 1) public health facilities (government hospitals, health centres, dispensaries, village health units, and other government health facilities); 2) Part One pharmacies (pharmacies licensed by the Ministry of Health); 3) private health facilities (private clinics, missionary hospitals, and NGO health centres); and 4) other outlets (shops and stalls located in and outside of markets, and hawkers) [see Appendix A for definitions and numbers of each type of outlet].

Among outlets, three questionnaires were administered: 1) Screening Questionnaire 2) Audit sheet and 3) Provider Questionnaire. For all outlets, trained interviewers administered the screening questionnaire to collect information on the outlet type; location, including the outlet's longitude and latitude; and information on availability of antimalarials. Among those outlets that stocked antimalarials at the time of survey, the audit sheet was administered. For each antimalarial, information was recorded on the brand and generic names, strength, expiry, amount sold in the last week and price to the consumer. Among outlets that stocked antimalarials at the time of interview, or in the past three months, the interviewer collected information on provider demographics, knowledge, and perceptions. Interviewers observed outlet licensing and storage conditions of medicines using the provider questionnaire.

Several validation and data checking steps occurred during and after data collection. Double data entry was conducted using Microsoft Access (Microsoft Cooperation, Seattle, WA, USA). Data was analysed using SPSS 17.0 (SPSS Inc., Chigaco, IL, USA).

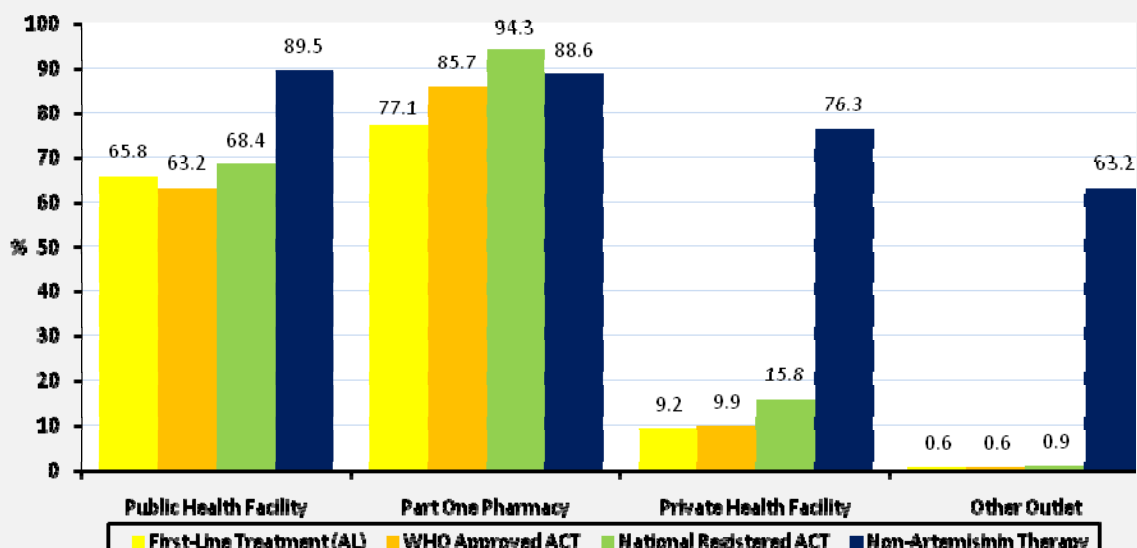
For more information on the study design log on to www.ACTwatch.info.

Results:

Data were collected from 17th to 31st October 2008. A total of 1,176 outlets were sampled. In 35 of the sampled outlets, an eligible provider was not available to participate; 15 outlets were not open at the time of the survey visit (up to three visits before exclusion); 15 outlets had permanently closed down; 4 providers refused to be interviewed; 4 outlets were inaccessible; and 7 outlets were unable to be interviewed for other reasons. These outlets were excluded from the analysis. Overall, 1,096 providers agreed to participate in the *ACTwatch* outlet survey. Of these, 845 outlets stocked antimalarials at any point in the three months prior to the interview, and 752 outlets stocked antimalarials at the time of the interview.

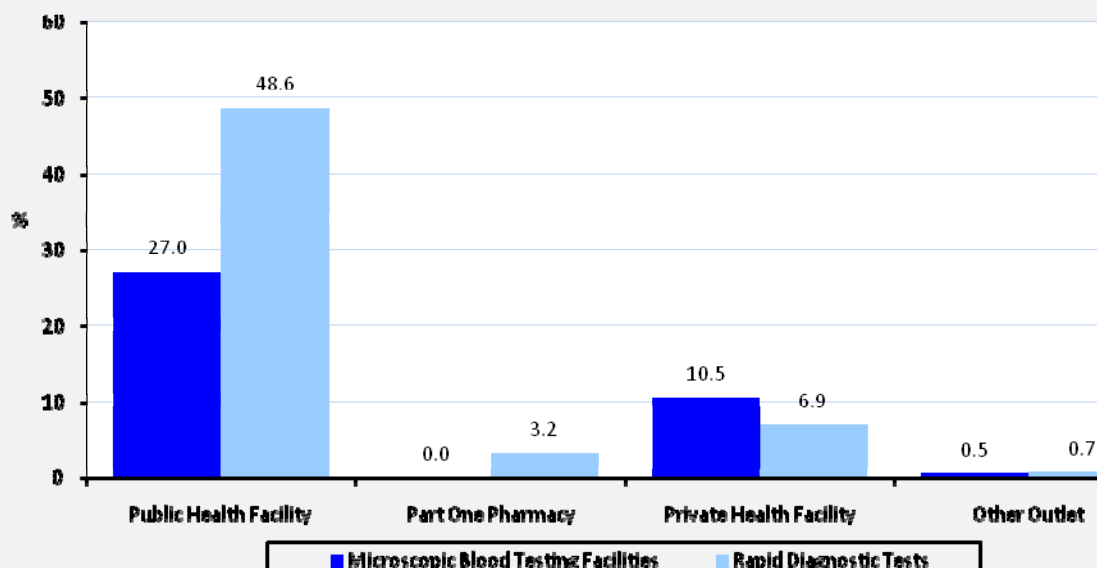
AVAILABILITY OF ANTIMALARIALS: The census of outlets found that 68.6% had antimalarials in stock. Less than one-tenth of these, or 6.6% of all outlets, stocked the recommended first-line treatment for uncomplicated malaria, artemether-lumefantrine (AL), 20mg/120mg. While the majority of public health facilities and Part One pharmacies stocked the first-line treatment, availability in private health facilities was low (<10%). Non-artemisinin therapies were more commonly stocked than the first-line treatment in all outlet types. Although very few Other Outlets stocked ACTs, the majority stocked non-artemisinin therapies (63.2%).

Figure 1. Availability of Antimalarials by Outlet Type



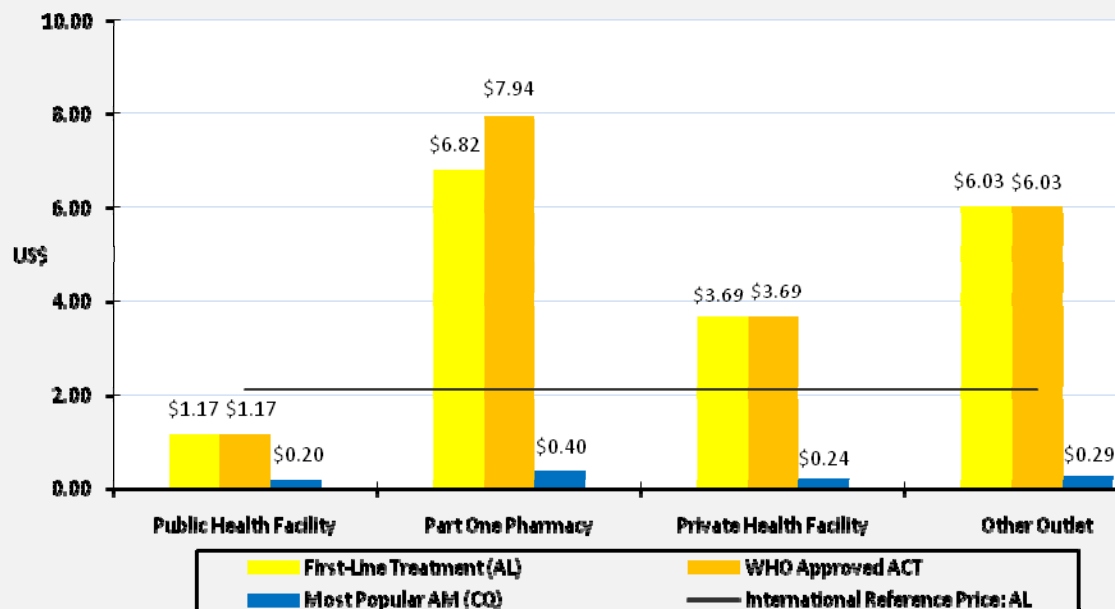
AVAILABILITY OF DIAGNOSTIC BLOOD TESTING: Of all outlets stocking antimalarials in the last three months, 5.6% offered diagnostic testing services of some kind. 3.3% of outlets had microscopic blood testing while 3.9% offered rapid diagnostic tests (RDTs). Diagnostic testing was available at 56.8% of public health facilities, mostly through RDTs. 13.7% of private health facilities offered some kind of testing service; availability of testing services at Part One pharmacies and Other Outlets was very low (<3.2%).

Figure 2. Proportion of Outlets with Microscopic Blood Testing Facilities & Rapid Diagnostic Tests



PRICE OF ANTIMALARIALS: With few exceptions, antimalarials are not distributed for free in Benin, even in the public sector. The median price of the first-line treatment was \$5.68. In comparison, the median price of the most popular antimalarial, chloroquine (CQ), was \$0.29. Although all sectors provide antimalarials for a cost, the median price of the first-line treatment in public health facilities was one-fifth that of the median price in private outlets (\$1.17, compared to \$6.25). Outside of public health facilities, the median price of ACTs was 2 to 4 times the minimum daily wage in Benin. Overall, 43.0% of outlets offered credit to consumers for the purchase of antimalarials.

Figure 3. Median Price of a Full Adult Course Antimalarial Treatment

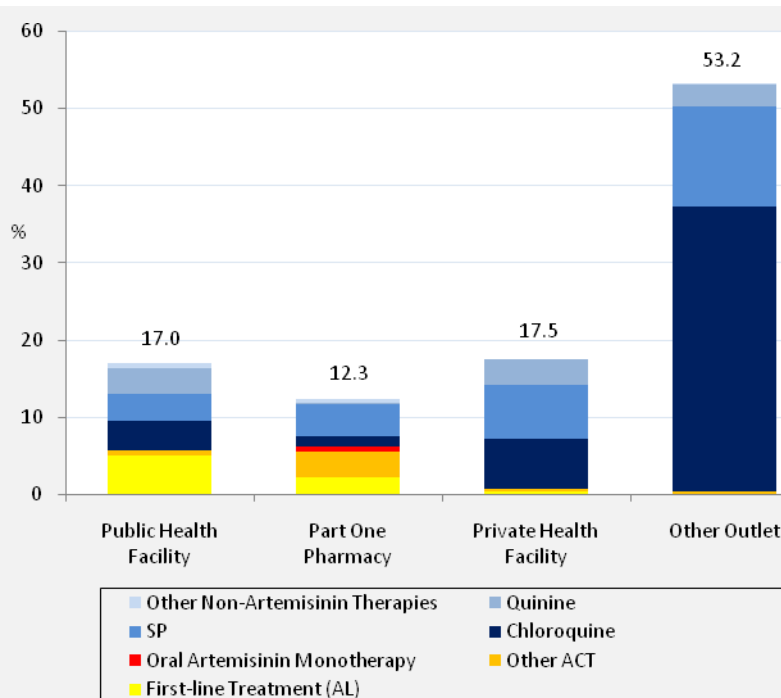


VOLUMES OF ANTIMALARIALS SOLD/DISTRIBUTED: 87.3% of all full

Figure 4. Relative Volumes of Full Course Adult treatments Sold/Distributed in the Past Week

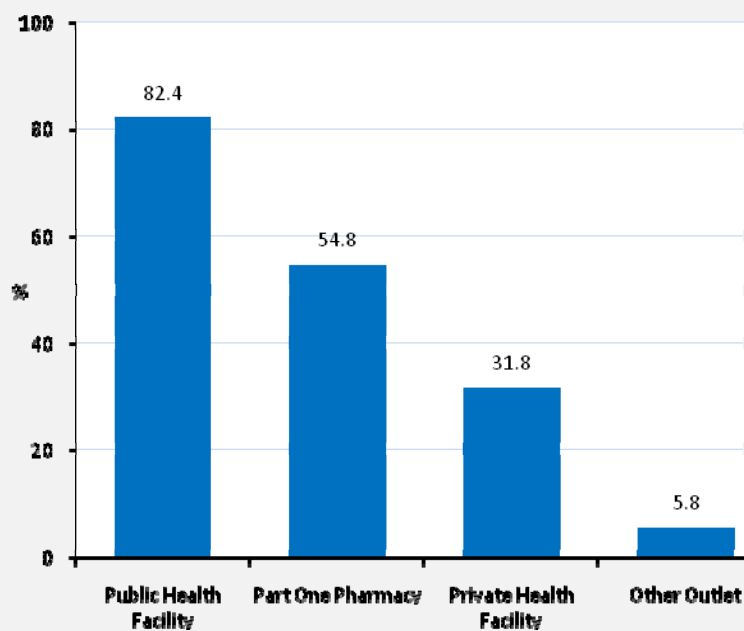
adult treatments distributed in Benin were non-artemisinin therapies, the most common being CQ (55.6%). ACTs accounted for 12.1% of all AM distribution, with the first-line treatment comprising 7.5% of total distribution. The first-line treatment was mostly distributed by public health facilities and Part One pharmacies (66.4% and 29.0% of first-line volumes respectively).

The private sector dominated the antimalarial market, accounting for 83% of AMs sold/distributed. Other Outlets – boutiques, stalls and hawkers – distributed more than half of all AMs (53.2%). Nearly all AMs distributed by Other Outlets (99.3%) were non-artemisinin therapies.



PROVIDER KNOWLEDGE: Overall, 15.7% of providers were able to state that AL is the recommended first-line treatment for uncomplicated malaria in Benin. Knowledge was highest among providers at public health facilities (82.4%). Just over half of Part One pharmacy providers (54.8%) knew the recommended first-line treatment. At Other Outlets – responsible for 53% of all antimalarial distribution – knowledge was low. Only 5.8% of providers could correctly state the first-line treatment.

Figure 5. Provider Knowledge of Recommended First-line Treatment



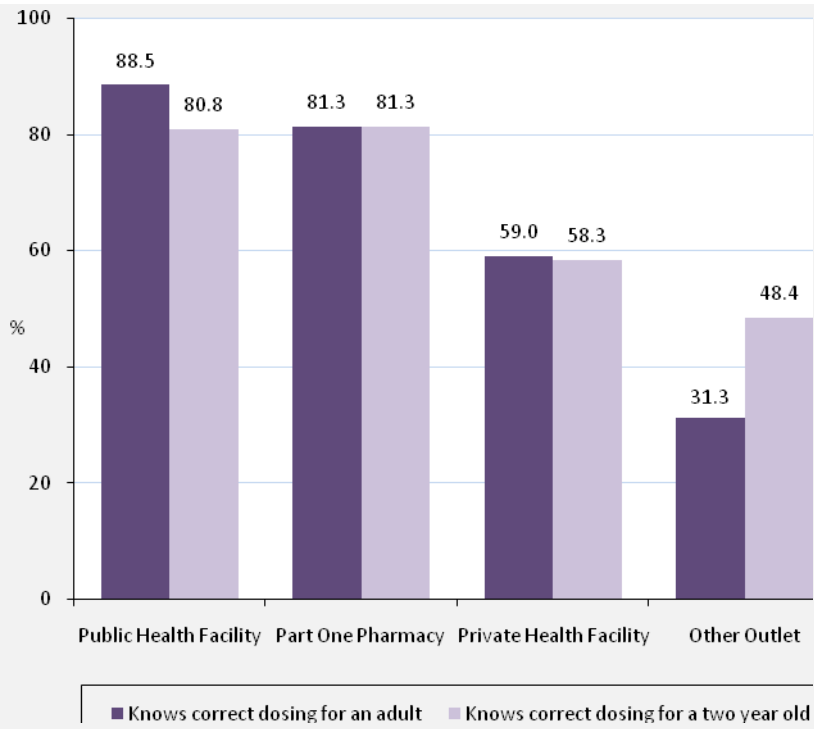
Among those providers who knew

Figure 6. Provider Knowledge of First-line Dosing Regimens

AL was the recommended first-line treatment for uncomplicated malaria, 61.4% were able to correctly state the dosing regimen of AL for an adult; 64.5% were able to correctly state the dosing regimen for a two-year old child.

Knowledge of treatment regimens was higher in public health facilities and Part One pharmacies than in private health facilities.

Knowledge of correct dosing regimens was lowest among providers in Other Outlets.



Country Background

Benin is located in West Africa, sharing borders with Burkina Faso, Niger, Nigeria and Togo. The population is approximately 8.8 million, of which 60% of people are estimated to live in rural areas. One third of the population lives below the poverty line and per capita GDP is \$1,500.¹ One in eight children dies before reaching their fifth birthday.² Malaria is considered to be the leading cause of morbidity and mortality among children under five, accounting for 41% of outpatient visits and 29% of hospitalizations for children under five, respectively.³

Epidemiology and Malaria Control Strategies

Malaria epidemiology in Benin can be characterized as stable, endemic and, as such, the risk of an epidemic is considered to be low. The population groups most at risk of mortality are pregnant women and children under five. The predominant parasite species is *P.falciparum*. The National Malaria Control Strategy takes high risk groups into account in setting its objectives. Interventions include IPT for pregnant women; distribution of long-lasting insecticide treated nets via campaigns and antenatal clinics; indoor residual spraying; case management at the facility level using ACTs; and the goal of having confirmed diagnosis for everyone over the age of five either through microscopy or RDTs.

National Treatment Policy

In 2005, the country adopted artemether-lumefantrine (AL) as the first-line treatment for uncomplicated malaria. Quinine is recommended for the treatment of severe malaria. According to national policy, treatment of uncomplicated malaria is provided at public facilities for a fee: blister packs of 6, 12, 18, and 24 AL tablets are sold for 150CFA (≈\$0.36), 300CFA (≈\$0.71), 450CFA (≈\$1.07), and 600CFA (≈\$1.43), respectively.⁴

As indicated above, the National Malaria Control Programme has established a policy of recommending confirmation with a diagnostic test for people over the age of five. The recommendation for those under five years of age is to treat based on clinical signs. Oral artemisinin monotherapy has been banned in Benin since 2006.⁵

Antimalarial Treatment Distribution and Delivery

Artemisinin-based combination therapy only became widely available in the public sector in 2009. Before then, it was most commonly available through the private sector, which has historically been an important distribution channel of antimalarials in Benin. The private commercial sector in Benin encompasses a diverse range of outlet types, ranging from registered pharmacies and rural drug depots; registered and unregistered private for-profit clinics and not-for-profit clinics run by faith-based or non-governmental organizations; and unregistered stalls or shops that sell pharmaceuticals along with other fast moving consumer goods.⁶

ACTs were first introduced in the public sector through a Global Fund-supported pilot project and the *Projet Intégré de Santé Familiale* (PISAF), a Mission-funded Integrated Family Health Project. By late 2008, about one-third of the country was covered (i.e., ACTs delivered to facilities and staff trained), including the Departments of Mono, Couffo, Zou, and Collines.⁷

Inefficiencies in the public sector supply management system have hindered the distribution of ACTs in public health facilities. An assessment conducted by Management Sciences for Health identified both frequent stock-outs of ACTs at public health facilities, and a large stock of AL warehoused by the Central Medical Stores (CAME) approaching expiration. Limited means of transportation from CAME's central and regional warehouses to public health facilities,

¹ CIA (2009). The World Factbook: Benin. <https://www.cia.gov/library/publications/the-world-factbook/geos/bn.html>.

² UNICEF (2009). State of the World's Children.

³ Demographic and Health Survey (2006). Benin.

⁴ President's Malaria Initiative, Benin Malaria Operational Plan, Year 2.

⁵ WHO (2008) World Malaria Report 2008. WHO/HTM/GMP/2008.1. <http://apps.who.int/malaria/wmr2008/MAL2008-CountryProfiles/MAL2008-Benin-EN.pdf>

⁶ Tougher S, et al. (2009). "The private commercial sector distribution chain for antimalarial drugs in Benin".

⁷ President's Malaria Initiative, Benin Malaria Operational Plan, Year 2.

insufficient space and inappropriate storage conditions, and an inadequate information management system to monitor consumption of antimalarials at public health facilities have all contributed to this situation.⁸

Malaria Financing

Financing for malaria control activities has increased dramatically in recent years, from less than \$10 million annually between 2001 and 2005, to in excess of \$35 million in 2006. The National Malaria Control Programme received funding from the Global Fund to fight AIDs, Tuberculosis & Malaria (GFATM) Round 3 Grant (\$2.14 million), providing some 458 villages with ACTs targeting children under 5 years through health facilities and community-based management. This project was implemented in Mono and Couffo, two departments with high malaria transmission. A Round 7 (\$22.6 million) grant launched in July 2008 is set to extend the project to cover community-level ACT distribution for approximately 40% of the population. Additionally, in 2007 a four-year grant (\$31 million) from the World Bank Malaria Booster Programme commenced covering an important portion of ACT needs and the bulk of RDTs required. Benin has also received \$3.6 million in 2007 and \$13.8 million in 2008 for malaria control activities from President's Malaria Initiative (PMI). Of the \$13.8 million allocated for 2009, approximately \$2 million of this is for malaria treatment and diagnosis.⁹

⁸ Ndoye, T, et al. (2009). Évaluation de la gouvernance, de la transparence et des opérations de la Centrale d'Achats des Médicaments Essentiels du Bénin, décembre 2008. Présenté à l'Agence des États-Unis pour le Développement International par le Programme Strengthening Pharmaceutical Systems (SPS). Arlington, VA: Management Sciences for Health.

⁹ President's Malaria Initiative, Benin Malaria Operational Plan, Year 2.

Results

Study-wide Trends

Availability of Antimalarials and Diagnostic Tests	Oct. 2008	May 2009	2011
	%		
Proportion of outlets that had:	N=1,096¹⁰		
Antimalarials in stock at the time of survey visit	68.6		
First-line treatment (AL)	6.6		
WHO approved ACT	6.8		
Nationally registered ACT	8.4		
Non-WHO/nationally registered ACT	2.7		
Non-artemisinin therapies	66.7		
• Chloroquine	50.9		
• Sulfadoxine-Pyrimethamine (SP)	21.9		
• Second-line treatment (Quinine)	29.7		
Artemisinin monotherapy	3.7		
• Oral artemisinin monotherapy	2.3		
	N=533		
A WHO approved or nationally registered ACT as the most distributed antimalarial, by volume of sales/distribution in the past week	4.1		
	N=844		
No disruption in stock in the past three months	32.5		
	N=101¹¹		
No disruption in stock of first-line treatment in the past three months	52.5		
	N=669		
Expired stock of any antimalarial	3.6		
	N=72		
Expired stock of first-line treatment (AL)	5.6		
	N=767		
Acceptable storage conditions for medicines	75.0		
	N=826		
Microscopic blood testing facilities	3.3		
	N=816		
Rapid diagnostic tests	3.9		

¹⁰ Denominators vary for indicators due to skip patterns, small numbers of refused questions, or missing data. Fluctuations in denominators for reasons other than skip patterns range from 0 – 29.2%.

¹¹ Denominators are among providers that had the first-line treatment in stock at any point in the last three months.

Price of Antimalarials	Oct. 2008	May 2009	2011
Distribution of free drugs	%	%	%
Proportion of first-line ACTs distributed free of cost (by volumes of adult treatments)	0.0		
Median price of a full course of an adult treatment of:	Median (N of AMs)¹²		
First-line treatment (AL)	\$5.68 ⁽¹⁰⁰⁾		
WHO approved ACT	\$7.56 ⁽¹⁰⁷⁾		
Nationally registered ACT	\$6.82 ⁽²⁴⁶⁾		
Non-WHO/nationally registered ACT	\$4.28 ⁽¹¹⁾		
Non-artemisinin therapy	\$0.49 ^(1,384)		
Oral artemisinin monotherapy	\$5.73 ⁽³⁴⁾		
Chloroquine (the 'most popular' antimalarial treatment in the Benin)	\$0.29 ⁽⁵⁸⁴⁾		
Median price of a full course of an adult treatment of ACT relative to chloroquine (the 'most popular' antimalarial treatment in Benin):	Ratio		
First-line treatment (AL)	19.6		
WHO approved ACT	26.1		
Nationally registered ACT	23.5		
Non-WHO/nationally registered ACT	14.8		
Median price of a full course of an adult treatment of ACT relative to the minimum legal daily wage (\$1.94):	Ratio		
First-line treatment (AL)	2.9		
WHO approved ACT	3.9		
Nationally registered ACT	3.5		
Non-WHO/nationally registered ACT	2.2		
	Ratio		
Median price of a full course adult first-line treatment relative to the international reference price (\$2.12)	2.7		
	%		
Proportion of outlets that offer credit to consumers for antimalarials	43.0		

¹² A total of 2,489 antimalarials were found in 752 outlets. Of these, 1,675 antimalarials are included in the pricing analysis; no antimalarials were available for free.

Volumes of Antimalarials Sold/Distributed	Oct. 2008			May 2009	2011
	Total number of full course adult treatments	Number of outlets that stocked each category of AM	Mean per outlet		
Volumes of full course adult treatments (sold or distributed in the past week) of:					
First-line treatment (AL)	482	72	6.7		
WHO approved ACT	465	75	6.2		
Nationally registered ACT	728	92	7.9		
Non-WHO/nationally registered ACT	46	30	1.5		
Non-artemisinin therapy	5,632	731	7.7		
• Chloroquine	3,123	558	5.6		
• Sulfadoxine-Pyrimethamine (SP)	1,844	240	7.7		
• Second-line treatment (Quinine)	623	326	1.9		
Oral artemisinin monotherapy	40	25	1.6		
Each antimalarial category as a proportion of the total volume of all antimalarials sold or distributed in the past week:^{13, 14}	%				
First-line treatment (AL)	7.5				
WHO approved ACT	7.2				
Nationally registered ACT	11.3				
Non-WHO/nationally registered ACT	0.7				
Non-artemisinin therapy	87.3				
• Chloroquine	48.4				
• Sulfadoxine-Pyrimethamine (SP)	28.6				
• Second-line treatment (Quinine)	9.7				
Oral artemisinin monotherapy	0.6				

¹³ There were a total of 6,449.4 full course adult treatments of antimalarials sold or distributed in the past one week. This was the denominator used to calculate the proportion for each category.

¹⁴ Percentages total more than 100% in each column because ACTs that are WHO approved, nationally registered, and the first-line treatment are not mutually exclusive.

Provider Knowledge and Perceptions	Oct. 2008	May 2009	2011
	%		
Proportion of providers that:	N=765		
Correctly state the recommended first-line treatment for uncomplicated malaria	15.7		
	N=114		
Correctly state the dosing regimen of the first-line treatment for an adult ¹⁵	61.4		
	N=110		
Correctly state the dosing regimen of the first-line treatment for a two year old	64.5		
	N=739		
Can list at least one health danger sign in a child that requires referral to a public health facility:	62.7		
• Convulsions	17.6		
• Vomiting	34.1		
• Unable to drink/breastfeed	8.3		
• Excessive sleep/difficult to wake up	34.8		
• Unconscious/coma	8.5		
	N=767		
Agree with the statement, "Most customers request an antimalarial by brand name or generic name."	71.8		
	N=771		
Agree with the statement, "I decide which antimalarial medicine most customers receive."	41.1		

¹⁵ Questions on dosing regimens were only administered to those providers that correctly stated the recommended first-line treatment for uncomplicated malaria.

Comparisons by Outlet Type

In this section, availability, price, volumes and provider knowledge is compared across outlet types. A small number of outlets (N=9) are missing the identifying outlet classification and therefore, throughout this section, the figures presented by outlet type do not add up to the national total.

Availability of Antimalarials ¹⁶	Public Health Facility	Part One Pharmacy	Private Health Facility	Other Outlet	Total
	%	%	%	%	%
Proportion of outlets that had:	N=38	N=35	N=152	N=862	N=1,09
Antimalarials in stock at the time of survey visit	92.1 ^a	97.1 ^a	81.6 ^a	64.3 ^b	68.6
First-line treatment (AL)	65.8 ^a	77.1 ^a	9.2 ^b	0.6 ^c	6.6
WHO approved ACT	63.2 ^a	85.7 ^a	9.9 ^b	0.6 ^c	6.8
Nationally registered ACT	68.4 ^a	94.3 ^b	15.8 ^c	0.9 ^d	8.4
Non-WHO/nationally registered ACT	15.8 ^a	42.9 ^a	2.6 ^b	0.6 ^b	2.7
Non-artemisinin therapies	89.5 ^a	88.6 ^a	76.3 ^a	63.2 ^b	66.7
• Chloroquine	15.8 ^a	48.6 ^{bc}	34.2 ^{ab}	55.7 ^c	50.9
• Sulfadoxine-Pyrimethamine (SP)	65.8 ^a	80.0 ^a	29.6 ^b	16.1 ^c	21.9
• Second-line treatment (Quinine)	84.2 ^a	51.4 ^b	73.0 ^{ab}	18.8 ^c	29.7
• Quinine Injection	57.9 ^a	28.6 ^a	40.8 ^a	0.3 ^b	8.9
Artemisinin monotherapy	18.4 ^a	65.7 ^b	5.3 ^a	0.2 ^c	3.7
• Oral artemisinin monotherapy	2.6 ^a	57.1 ^b	1.3 ^a	0.1 ^a	2.3
• Injectable/suppository artemisinin monotherapy	15.8 ^{ab}	45.7 ^a	3.9 ^b	0.1 ^c	2.7
	N=32	N=19	N=89	N=390	N=533
A WHO approved or nationally registered ACT as the most distributed antimalarial, by volume of sales/distribution in the past week	43.8 ^a	31.6 ^a	2.2 ^b	0.0 ^b	4.1
	N=37	N=34	N=131	N=636	N=844
No disruption in stock in the past three months	37.8 ^a	26.5 ^a	35.9 ^a	31.8 ^a	32.5
	N=27	N=27	N=34	N=12	N=101
No disruption of stock of first-line treatment in the past three months	70.4 ^a	81.5 ^a	32.4 ^b	8.3 ^b	52.5

¹⁶ Statistical difference is labeled with a superscript, a, b, c, or d (p<0.0083). Proportions or medians with the same letter in their superscripts do not differ significantly from one another according to a chi-square or a Mood's median test, respectively, with a type 1 error rate of 0.0083. The significance level of p<0.0083 is used to account for the number of pair-wise tests being conducted. With 4 outlet types, 6 pair-wise comparisons are needed to test each type against the other three. If the standard p-value of 0.05 was used in each comparison, the probability of a false positive would increase from 5% to 26.5%. The standard type 1 error rate of 0.05 is thus divided by 6 (0.05 / 6 = 0.0083), the number of comparisons, to determine a type 1 error rate that is no more likely to produce a false positive across 6 tests than a single test with a p<0.05.

Availability of Antimalarials and Diagnostic Tests	Public Health Facility	Part One Pharmacy	Private Health Facility	Other Outlet	Total
	%	%	%	%	%
Proportion of outlets that had:	N=34	N=31	N=119	N=480	N=669
Expired stock of any antimalarial	11.8 ^a	3.2 ^a	5.0 ^a	2.5 ^a	3.6
	N=25	N=27	N=14	N=5	N=72
Expired stock of first-line treatment (AL)	12.0 ^a	0.0 ^a	7.1 ^a	0.0 ^a	5.6
	N=33	N=29	N=113	N=472	N=652
Expired stock of non-artemisinin therapy	2.9 ^a	0.0 ^a	4.3 ^a	2.2 ^a	2.9
	N=7	N=22	N=8	N=2	N=39
Expired stock of artemisinin monotherapy	0.0 ^a	4.5 ^a	0.0 ^a	0.0 ^a	2.6
	N=33	N=30	N=119	N=579	N=767
Acceptable storage conditions for medicines	97.0 ^a	83.3 ^{ab}	78.2 ^{ab}	72.7 ^b	75.0
	N=37	N=33	N=133	N=617	N=826
Microscopic blood testing facilities	27.0 ^a	0.0 ^{bc}	10.5 ^{ac}	0.5 ^b	3.3
	N=37	N=31	N=131	N=611	N=816
Rapid diagnostic tests	48.6 ^a	3.2 ^{bc}	6.9 ^b	0.7 ^c	3.9

Price of Antimalarials	Public Health Facility	Part One Pharmacy	Private Health Facility	Other Outlet	Total
Distribution of free drugs:	%	%	%	%	%
Proportion of first-line ACTs distributed free of cost (by volumes of adult treatments)	0.0	0.0	0.0	0.0	0.0
Median price of a full course of an adult treatment of:	Median (N of AMs)	Median (N of AMs)	Median (N of AMs)	Median (N of AMs)	Median (N of AMs)
First-line treatment (AL)	\$1.17 ^{a(24)}	\$6.82 ^{b(65)}	\$3.69 ^{c(8)}	\$6.03 ^{bc(2)}	\$5.68 ⁽¹⁰⁰⁾
WHO approved ACT	\$1.17 ^{a(23)}	\$7.94 ^{b(71)}	\$3.69 ^{b(8)}	\$6.03 ^{b(2)}	\$7.56 ⁽¹⁰⁷⁾
Nationally registered ACT	\$1.17 ^{a(29)}	\$6.92 ^{b(198)}	\$3.89 ^{c(9)}	\$6.13 ^{b(6)}	\$6.82 ⁽²⁴⁶⁾
Non-WHO/nationally registered ACT	--	\$5.00 ^{a(5)}	\$3.89 ^{a(3)}	\$1.56 ^{a(3)}	\$4.28 ⁽¹¹⁾
Non-artemisinin therapy	\$2.45 ^{a(80)}	\$1.12 ^{b(100)}	\$3.27 ^{c(273)}	\$0.36 ^{d(913)}	\$0.49 ^(1,384)
Oral artemisinin monotherapy	\$9.80 ^{a(1)}	\$5.80 ^{a(30)}	--	\$5.67 ^{a(1)}	\$5.73 ⁽³⁴⁾
Chloroquine, the 'most popular' antimalarial treatment in Benin	\$0.20 ^{abc(5)}	\$0.40 ^{a(10)}	\$0.24 ^{b(49)}	\$0.29 ^{c(517)}	\$0.29 ⁽⁵⁸⁴⁾
Median price of a full course of an adult treatment of ACT relative to chloroquine (the 'most popular' antimalarial treatment in Benin):	Ratio	Ratio	Ratio	Ratio	Ratio
First-line treatment (AL)	5.9	17.1	15.4	20.8	19.6
WHO approved ACT	5.9	19.9	15.4	20.8	26.1
Nationally registered ACT	5.9	17.3	16.2	21.1	23.5
Non-WHO/nationally registered ACT	--	12.5	16.2	5.4	14.8
Median price of a full course of an adult treatment of ACT relative to the minimum legal daily wage in Benin (\$1.94):	Ratio	Ratio	Ratio	Ratio	Ratio
First-line treatment (AL)	0.6	3.5	1.9	3.1	2.9
WHO approved ACT	0.6	4.1	1.9	3.1	3.9
Nationally registered ACT	0.6	3.6	2.0	3.2	3.5
Non-WHO/nationally registered ACT	--	2.6	2.0	0.8	2.2
	Ratio	Ratio	Ratio	Ratio	Ratio
Median price of a full course adult first-line treatment relative to the international reference price (\$2.12)	0.6	3.2	1.7	2.8	2.7
		%	%	%	%
		N=31	N=126	N=564	N=721
Proportion of outlets that offer credit to consumers for antimalarials	--	41.9 ^a	40.5 ^a	43.6 ^a	43.0

Volumes of Antimalarials Sold/Distributed	Public Health Facility		Part One Pharmacy		Private Health Facility		Other Outlet		Total
	Total number of full course adult treatments	Number of outlets that stocked each category of AM	Total number of full course adult treatments	Number of outlets that stocked each category of AM	Total number of full course adult treatments	Number of outlets that stocked each category of AM	Total number of full course adult treatments	Number of outlets that stocked each category of AM	Total number of full course adult treatments
Volumes of full course adult treatments sold or distributed in the past week:									
First-line treatment (AL)	320	25	140	27	21	14	1	5	482
WHO approved ACT	316	24	127	30	21	15	1	5	465
Nationally registered ACT	358	26	345	33	22	24	4	8	728
Non-WHO/nationally registered ACT	--	6	5	15	20	4	21	5	46
Non-artemisinin therapy	733	34	401	31	1081	116	3390	545	5,632
• Chloroquine	247	6	93	17	414	52	2361	480	3,123
• Sulfadoxine-Pyrimethamine (SP)	277	25	264	28	448	45	840	139	1,844
• Second-line treatment (Quinine)	209	32	10	18	220	111	183	162	623
Oral artemisinin monotherapy	0	7	40	23	--	8	0	2	40
Each antimalarial category as a proportion of the total volume of all antimalarials sold or distributed in the past week:¹⁷									
	%		%		%		%		%
First-line treatment [AL]	29.3		17.7		1.9		0.0		7.5
WHO approved ACT	29.0		16.0		1.9		0.0		7.2
Nationally registered ACT	32.8		43.5		2.0		0.1		11.3
Non-WHO/nationally registered ACT	--		0.6		1.8		0.6		0.7
Non-artemisinin therapy	67.2		50.6		96.2		99.3		87.3
• Chloroquine	22.6		11.7		36.8		69.1		48.4
• Sulfadoxine-Pyrimethamine (SP)	25.4		33.3		39.9		24.6		28.6
• Second-line treatment (Quinine)	19.2		1.3		19.6		5.2		9.7
Oral artemisinin monotherapy	0		5.0		--		0		0.6

¹⁷ Percentages total more than 100% in each column because ACTs that are WHO approved, nationally registered, and the first-line treatment are not mutually exclusive.

Provider Knowledge and Perceptions	Public Health Facility	Part One Pharmacy	Private Health Facility	Other Outlet	Total
	%	%	%	%	%
Proportion of providers that:	N=34	N=31	N=129	N=565	N=765
Correctly state the recommended first-line treatment for uncomplicated malaria	82.4 ^a	54.8 ^{ab}	31.8 ^b	5.8 ^c	15.7
	N=26	N=16	N=39	N=32	N=114
Correctly state the dosing regimen of the first-line treatment for an adult ¹⁸	88.5 ^a	81.3 ^a	59.0 ^{ab}	31.3 ^b	61.4
	N=26	N=16	N=36	N=31	N=110
Correctly state the dosing regimen of the first-line treatment for a two year old	80.8 ^a	81.3 ^a	58.3 ^a	48.4 ^a	64.5
		N=32	N=129	N=578	N=739
Can list at least one health danger sign in a child that requires referral to a public health facility:	--	75.0 ^a	70.5 ^a	60.2 ^a	62.7
• Convulsions	--	31.3 ^a	43.4 ^a	11.1 ^b	17.6
• Vomiting	--	31.3 ^a	30.2 ^a	35.1 ^a	34.1
• Unable to drink/breastfeed	--	12.5 ^a	4.7 ^a	8.8 ^a	8.3
• Excessive sleep/difficult to wake up	--	37.5 ^{ab}	24.8 ^a	36.9 ^b	34.8
• Unconscious/coma	--	12.5 ^{ab}	28.7 ^a	3.8 ^b	8.5
	N=34	N=31	N=129	N=568	N=767
Agree with the statement, "Most customers request an antimalarial by brand name or generic name."	17.6 ^a	35.5 ^{ab}	51.2 ^b	81.9 ^c	71.8
	N=34	N=31	N=127	N=574	N=771
Agree with the statement, "I decide which antimalarial medicine most customers receive."	52.9 ^a	45.2 ^a	85.0 ^b	30.5 ^a	41.1

¹⁸ Questions on dosing regimens were only administered to those providers that correctly stated the recommended first-line treatment for uncomplicated malaria.

Comparisons by Urban vs. Rural Areas

In this section, availability, price, volumes and provider knowledge is compared across urban and rural areas. A small number of outlets (N=11) are missing the identifying urban/rural classification information and therefore, throughout this section, the figures presented in the two strata do not add up to the national total.

Availability of Antimalarials and Diagnostic Tests ¹⁹	Urban	Rural	Total
	%	%	%
Proportion of outlets that had:	N=701	N=384	N=1,096
Antimalarials in stock at the time of survey visit	73.8 ^a	59.4 ^b	68.6
First-line treatment (AL)	7.0 ^a	6.0 ^a	6.6
WHO approved ACT	7.1 ^a	6.5 ^a	6.8
Nationally registered ACT	9.0 ^a	7.6 ^a	8.4
Non-WHO/nationally registered ACT	3.7 ^a	1.0 ^b	2.7
Non-artemisinin therapy	72.5 ^a	56.5 ^b	66.7
Artemisinin monotherapy	5.3 ^a	1.0 ^b	3.7
• Oral artemisinin monotherapy	3.1 ^a	0.8 ^b	2.3
	N=373	N=157	N=533
A WHO approved or nationally registered ACT as the most distributed antimalarial, by volume of sales/distribution in the past week	3.2 ^a	6.4 ^a	4.1
	N=570	N=265	N=844
No disruption in stock in the past three months	39.3 ^a	18.1 ^b	32.5
	N=67	N=32	N=101
No disruption in first-line treatment stock in the previous three months	40.3 ^a	59.4 ^a	52.5
	N=488	N=175	N=669
Expired stock of any antimalarial	2.0 ^a	8.0 ^b	3.6
	N=533	N=227	N=767
Acceptable storage conditions for medicines	73.2 ^a	79.3 ^a	75.0
	N=547	N=270	N=826
Microscopic blood testing facilities	3.7 ^a	2.6 ^a	3.3
	N=542	N=256	N=816
Rapid diagnostic tests	2.8 ^a	6.4 ^b	3.9

¹⁹ Statistical difference is labeled with a superscript, a or b (p<0.05). Proportions or medians that are both labeled with the superscript 'a' do not differ significantly from one another according to a chi-square or a Mood's median test, respectively, with a type 1 error rate of 0.05.

Price of Antimalarials	Urban	Rural	Total
Distribution of free drugs:	%	%	%
Proportion of first-line ACTs distributed free of cost (by volume of adult treatments)	0.0	0.0	0.0
Median price of a full course of an adult treatment of:	Median (N of AMs)	Median (N of AMs)	Median (N of AMs)
First-line treatment (AL)	\$5.68 ^{a(81)}	\$1.17 ^{b(19)}	\$5.68 ⁽¹⁰⁰⁾
WHO approved ACT	\$7.56 ^{a(86)}	\$1.17 ^{b(21)}	\$7.56 ⁽¹⁰⁷⁾
Nationally registered ACT	\$6.82 ^{a(221)}	\$1.17 ^{b(25)}	\$6.82 ⁽²⁴⁶⁾
Non-WHO/nationally registered ACT	\$5.00 ^{a(7)}	\$2.72 ^{a(4)}	\$4.28 ⁽¹¹⁾
Non-artemisinin therapy	\$0.58 ^{a(1,074)}	\$0.36 ^{b(307)}	\$0.49 ^(1,384)
Oral artemisinin monotherapy	\$5.73 ^{a(32)}	\$8.26 ^{a(2)}	\$5.73 ⁽³⁴⁾
Chloroquine (the 'most popular' antimalarial treatment in Benin)	\$0.29 ^{a(410)}	\$0.24 ^{a(171)}	\$0.29 ⁽⁵⁸⁴⁾
Median price of a full course of an adult treatment of ACT relative to chloroquine (the 'most popular' antimalarial treatment in the Benin):	Ratio	Ratio	Ratio
First-line treatment (AL)	19.6	4.9	19.6
WHO approved ACT	26.1	4.9	26.1
Nationally registered ACT	23.5	4.9	23.5
Non-WHO/nationally registered ACT	17.2	11.3	14.8
Median price of a full course of an adult treatment of ACT relative to the minimum legal daily wage in Benin (\$1.94):	Ratio	Ratio	Ratio
First-line treatment (AL)	2.9	0.6	2.9
WHO approved ACT	3.9	0.6	3.9
Nationally registered ACT	3.5	0.6	3.5
Non-WHO/nationally registered ACT	2.6	1.4	2.2
	Ratio	Ratio	Ratio
Median price of a full course adult first-line treatment relative to the international reference price (\$2.12)	2.7	0.6	2.7
	%	%	%
	N=501	N=212	N=721
Proportion of outlets that offer credit to consumers for antimalarials	36.1 ^a	60.4 ^b	43.0

Volume of Antimalarials Sold/Distributed	Urban		Rural		Total
	Total number of full course adult treatments	Number of outlets that stocked each category of AM	Total number of full course adult treatments	Number of outlets that stocked each category of AM	Total number of full course adult treatments
Volumes of full course adult treatments (sold or distributed in the past week) of:					
First-line treatment (AL)	387	49	95	23	482
WHO approved ACT	370	50	95	25	465
Nationally registered ACT	631	63	97	29	728
Non-WHO/nationally registered ACT	28	26	18	4	46
Non-artemisinin therapy	3474	508	2153	217	5632
Oral artemisinin monotherapy	40	22	0	3	40
Each antimalarial category as a proportion of the total volume of all antimalarials sold or distributed in the past week:²⁰	%		%		%
First-line treatment (AL)	9.3		4.2		7.5
WHO approved ACT	8.9		4.2		7.2
Nationally registered ACT	15.1		4.3		11.3
Non-WHO/nationally registered ACT	0.7		0.8		0.7
Non-artemisinin therapy	83.2		95.0		87.3
Oral artemisinin monotherapy	1.0		0		0.6

²⁰ Percentages total more than 100% in each column because ACTs that are WHO approved, nationally registered, and the first-line treatment are not mutually exclusive.

Provider Knowledge and Perceptions	Urban	Rural	Total
	%	%	%
Proportion of providers that:	N=523	N=234	N=765
Correctly state the government recommended first-line treatment for uncomplicated malaria	14.3 ^a	18.4 ^a	15.7
	N=71	N=41	N=114
Correctly state the dosing regimen of the first-line treatment for an adult ²¹	70.4 ^a	46.3 ^b	61.4
	N=66	N=42	N=110
Correctly state the dosing regimen of the first-line treatment for a two year old	66.7 ^a	59.5 ^a	64.5
	N=514	N=217	N=739
Can list at least one health danger sign in a child that requires referral to a public health facility:	63.2 ^a	60.8 ^a	62.7
• Convulsions	17.5 ^a	17.5 ^a	17.6
• Vomiting	34.8 ^a	32.3 ^a	34.1
• Unable to drink/breastfeed	7.4 ^a	10.6 ^a	8.3
• Excessive sleep/difficult to wake up	37.5 ^a	27.6 ^b	34.8
• Unconscious/coma	10.3 ^a	4.6 ^b	8.5
	N=527	N=232	N=767
Agree with the statement, “Most customers request an antimalarial by brand name or generic name.”	75.5 ^a	62.5 ^b	71.8
	N=528	N=235	N=771
Agree with the statement, “I decide which antimalarial medicine most customers receive.”	40.0 ^a	43.4 ^a	41.1

²¹ Questions on dosing regimens were only administered to those providers that correctly stated the recommended first-line treatment for uncomplicated malaria.

Staff and Outlet Characteristics

	Study-wide
	%
Proportion of outlets:	N=773
with a staff member that has completed primary school education	53.2
	N=762
with a staff member that has completed secondary school education	21.7
	N=754
that have received government or NGO training within the past two years	21.0
	N=749
that have staff with a health related qualification	27.4
	N=779
that store medicines in dry areas	93.3
	N=777
that store medicines out of direct sunlight	82.5
	N=770
that do not keep medicines on the floor	97.8
	N=712
that report having a pharmacy, clinic, NGO or missionary license ²²	19.1
	N=729
where a license was observed by the interviewer	3.0

²² Questions regarding licensing were not asked in public health facilities.

Appendix A: Benin Outlet Type Descriptions

Outlet Types	N	Description
Public Health Facilities	38	
Referral hospital (health zone)	2	Government-run health facilities that provide prescription medicine following medical consultation or diagnosis. Fees are usually charged for consultations and medicines. Arrondissement health centres are the first-level of facility-based public health care, and are usually staffed by nurses, a midwife, and auxiliary staff; they usually include a dispensary and maternity. Commune health centres - the next level - are usually staffed by a doctor, nurses, and midwives. Across Benin's 34 health zones, there is an average of 2 communes per zone. Zonal hospitals receive first-level referral services and typically staffed with a surgeon and offer specialist health practitioners. Village health units are staffed by voluntary community health workers and are linked to an arrondissement or communal health centre.
Commune health centre	8	
Arrondissement health centre	15	
Village health unit	9	
Dispensary	2	
Maternity	2	
Part One Pharmacy	35	
Registered pharmacy	30	Registered pharmacies are licensed by the Ministry of Health and sell prescription medicine at commercial prices. These outlets are staffed by qualified health practitioners, with oversight/supervision provided by a pharmacist. They sell all classes of drugs. These outlets are highly regulated.
Rural outpost pharmacy	5	Rural outpost pharmacies are smaller pharmacies that are affiliated with and supplied by larger pharmacies in towns and urban areas. These small "sister" pharmacies are located in remote and rural areas and act as extensions of the larger pharmacies.
Private Health Facilities	152	
Private clinics	116	Private clinics are smaller than hospitals and many of them are not registered with the Ministry of Health. They provide consultations and examinations, and sell prescription medicines at commercial prices.
Non-Governmental Organization (NGO) Health Centre	33	These facilities provide prescription medicine following medical consultation or diagnosis. They are usually staffed with qualified health practitioners, though some smaller clinics run by NGOs have less well qualified staff.
Missionary hospital	3	
Other Outlets	862	
Boutique not at a market	266	Businesses/points of sale which sell fast moving consumer goods (e.g. food, household products), in addition to some medicines (most often antipyretics). Drugs sold at these locations are not regulated.
Boutique at a market	24	
Stall at a market	118	Stalls sell a variety of products that are displayed on tables (for example, on the roadside or in populated areas). They sell fast moving consumer goods and sometimes medicines, which are usually antipyretics. Drugs sold at these locations are not regulated.
Stall not at a market	355	
Hawker	86	Itinerant salesmen who often sell products of unknown origin, including medicines.
Other	13	Other outlet types that did not fit into any of the aforementioned outlet types.

Appendix B: First-line ACT and Registered ACTs

Government recommended first-line treatment for uncomplicated malaria

Generic Name	Strength	Dosage Form
Artemether/Lumefantrine	20mg/120mg	Tablet

Recommended treatment regimen for the government recommended first-line treatment for uncomplicated malaria

Body weight in kg (age)	# Tablets Day 1		# Tablets Day 2		# Tablets Day 3	
	0hr	8hr	24hr	36hr	48hr	60hr
5 -14 kg (6 months to 3 years)	1	1	1	1	1	1
15-24 kg (3 years to 7 years)	2	2	2	2	2	2
25-34 kg (7 years to 11 years)	3	3	3	3	3	3
35 kg and above (11 years and above)	4	4	4	4	4	4

Complete list of Benin's nationally registered ACTs²³ as of September 2008

Generic Name	Strength	Dosage Form	Brand Name	Manufacturer	Country of Manufacture
Artesunate/Amodiaquine	25mg/67.5mg	Tablet	Coarsucam	Sanofi Aventis	Morocco
Artesunate/Amodiaquine	25mg/75mg	Tablets	Malmed	Medinomics	India
Artesunate/Amodiaquine	50mg/135mg	Tablet	Coarsucam	Sanofi Aventis	Morocco
Artesunate/Amodiaquine	50mg/150mg	Tablets	Arsumoon	Guilin pharma	China
Artesunate/Amodiaquine	50mg/153mg	Tablets	Apoxin	Ajanta	India
Artesunate/Amodiaquine	50mg/153mg	Tablets	Arsucam	Sanofi Aventis	Morocco
Artesunate/Amodiaquine	50mg/153mg	Tablets	Larimal	Ipca	India
Artesunate/Amodiaquine	100mg/153mg	Tablets	Artediam	Odypharm	England
Artesunate/Amodiaquine	50mg/200mg	Tablets	Macsunate Plus	Macleods	India
Artesunate/Amodiaquine	100mg/270mg	Tablet	Coarsucam	Sanofi Aventis	Morocco
Artesunate/Amodiaquine	100mg/300mg	Tablets	Camoquin-plus	Pfizer	USA
Artesunate/Amodiaquine	200mg/200mg	Tablets	Amonate – adult	Dafra	Belgium
Artesunate/Amodiaquine	200mg/600mg	Tablets	Camoquin-plus	Pfizer	USA
Artemether/Lumefantrine	20mg/120mg	Tablets	Artefan	Ajanta	India
Artemether/Lumefantrine	20mg/120mg	Tablets	Coartem	Novartis	Switzerland
Artemether/Lumefantrine	15mg/90mg	Powder	Co-Artesiane	Dafra	Belgium
Artemether/Lumefantrine	20mg/120 mg	Suppository	Lonart	Bliss Gvs	India
Artemether/Lumefantrine	20mg/120mg	Tablets	Lonart	Bliss Gvs	India
Artemether/Lumefantrine	20mg/120mg	Tablets	Lumartem	Cipla	India
Artemether/Lumefantrine	20mg/120mg	Tablets	Lumether	Macleods	India
Artemether/Lumefantrine	40mg/240mg	Tablets	Artefan	Ajanta	India
Artemether/Lumefantrine	40mg/240mg	Tablets	Lufanter	Imex Health	India
Artemether/Lumefantrine	80mg/480mg	Tablets	Artefan	Ajanta	India

²³ Nationally registered ACTs were compiled through the Ministry of Health in Benin.

Generic Name	Strength	Dosage Form	Brand Name	Manufacturer	Country of Manufacture
Artemether/Lumefantrine	180mg/1080mg /60ml	Suspension	Cofantrine - enfant	EGR Pharma	India
Artemether/Lumefantrine	180mg/1080mg /60ml	Suspension	Lonart	Bliss Gvs	India
Artemether/Lumefantrine	360mg/2160mg /120ml	Suspension	Co-Artesiane	Dafra	Belgium
Artesunate/Mefloquine	50mg/125mg	Granules	Artequin	Mepha	Switzerland
Artesunate/Mefloquine	100mg/125mg	Tablets	Artequin - Child	Mepha	Switzerland
Artesunate/Mefloquine	100mg/250mg	Tablets	Artequin - Child	Mepha	Switzerland
Artesunate/Mefloquine	200mg/250mg	Tablets	Artequin	Mepha	Switzerland
Artesunate/Mefloquine	200mg/250mg	Tablets	Artequin - Adult	Mepha	Switzerland
Artemisinin/Naphthoquine	125mg/50mg	Tablets	Arco	Kunming	China
Artesunate/ Sulfamethoxyprazine/Pyrimethamine	100mg/250mg/ 12.5mg	Tablets	Asunatedenk 100 plus	Denk pharma	Germany
Artesunate/ Sulfamethoxyprazine/ Pyrimethamine	100mg/250mg/ 12.5mg	Tablets	Co-Arinate - junior	Dafra	Belgium
Artesunate/Sulfadoxine/ Pyrimethamine	100mg/500mg/ 25mg	Tablets	Artedar	Plethico	India
Artesunate/Sulfadoxine/ Pyrimethamine	200mg/500mg/ 25mg	Tablets	Asunatedenk 200 plus	Denk pharma	Germany
Artesunate/ Sulfamethoxyprazine/ Pyrimethamine	200mg/500mg/ 25mg	Tablets	Co-Arinate - adult	Dafra	Belgium
Artesunate/ Sulfamethoxyprazine/ Pyrimethamine	<i>Unknown</i> ²⁴	<i>Unknown</i>	Artecure	Stallion	India
Dihydroartemisinin /Piperaquine	<i>Unknown</i>	Tablets	Malacur	Salvat	<i>Unknown</i>
Dihydroartemisinin/ Piperaquine Phosphate	15mg/120mg	Granules	Darte-q	Steyuan pharm	China
Dihydroartemisinin/ Piperaquine Phosphate	40mg/320mg	Capsule	Darte-q	Steyuan pharm	China
Dihydroartemisinin/ Piperaquine Phosphate	40mg/320mg	Tablets	Duo-cotecxin	Holleypharm	China
Dihydroartemisinin/ Piperaquine Phosphate	80mg/640mg/ 80ml	Suspension	P-alaxin	Bliss Gvs	India
Dihydroartemisinin/Piperaquine Phosphate/Trimethoprim	32mg/320mg/ 90mg	Tablets	Artecom	Tonghe Pharma	China
Dihydroartemisinin/Sulfadoxine/ Pyrimethamine	160mg/500mg/ 25mg	Tablets	Alaxin	Bliss Gvs	India

²⁴ Packing information is not stated.

